

- 1 1. A transformed lactic acid bacterium, the bacterium comprising a DNA molecule
2 that comprises (1) a nucleotide sequence that encodes a protein allergen and (2) a promoter
3 operably linked to the nucleotide sequence.
- 1 2. The bacterium of claim 1, wherein the bacterium is of the genus *Lactobacillus*.
- 1 3. The bacterium of claim 2, wherein the bacterium is *Lactobacillus acidophilus*.
- 1 4. The bacterium of claim 1, wherein the bacterium is of the genus *Streptococcus*.
- 1 5. The bacterium of claim 4, wherein the bacterium is *Streptococcus thermophilus*.
- 1 6. The bacterium of claim 1, wherein the protein allergen is a dust mite allergen.
- 1 7. The bacterium of claim 6, wherein the dust mite is *Dermatophagoides*
2 *pteronyssinus*.
- 1 8. The bacterium of claim 7, wherein the allergen is Der p 5.
- 1 9. The bacterium of claim 1, wherein the promoter is a bacterial erythromycin
2 resistance gene promoter.
- 1 10. A transformed *Lactobacillus acidophilus* bacterium comprising a DNA molecule
2 that comprises a gene expressing Der p 5.
- 1 11. A transformed *Streptococcus thermophilus* bacterium comprising a DNA
2 molecule that comprises a gene expressing Der p 5.
- 1 12. A method of decreasing the production of IgE in a subject exposed to an allergen,
2 the method comprising
3 administering to a subject the bacterium of claim 1; and

4 expressing the allergen in the subject in an amount sufficient to induce in the subject
5 immunological tolerance to the allergen, wherein the tolerance includes suppression of
6 allergen-specific IgE production in the subject upon subsequent exposure to the allergen.

1 13. A method of decreasing the production of IgE in a subject exposed to a dust mite
2 allergen, the method comprising
3 administering to a subject the bacterium of claim 10; and
4 expressing the allergen in the subject in an amount sufficient to induce in the subject
5 immunological tolerance to the allergen, wherein the tolerance includes suppression of
6 allergen-specific IgE production in the subject upon subsequent exposure to the allergen.

1 14. A method of decreasing the production of IgE in a subject exposed to a dust mite
2 allergen, the method comprising
3 administering to a subject the bacterium of claim 11;
4 expressing the allergen in the subject in an amount sufficient to induce in the subject
5 immunological tolerance to the allergen, wherein the tolerance includes suppression of
6 allergen-specific IgE production in the subject upon subsequent exposure to the allergen.

1 15. A method of relieving bronchopulmonary congestion in a subject exposed to an
2 allergen, the method comprising
3 administering to a subject the bacterium of claim 1; and
4 expressing the allergen in the subject in an amount sufficient to relieve
5 bronchopulmonary congestion in the subject upon subsequent exposure to the allergen.

1 16. A method of relieving bronchopulmonary congestion in a subject exposed to a
2 dust mite allergen, the method comprising
3 administering to a subject the bacterium of claim 10; and
4 expressing the allergen in the subject in an amount sufficient to relieve
5 bronchopulmonary congestion in the subject upon subsequent exposure to the allergen.

1 17. A method of relieving bronchopulmonary congestion in a subject exposed to a
2 dust mite allergen, the method comprising
3 administering to a subject the bacterium of claim 11; and
4 expressing the allergen in the subject in an amount sufficient to relieve
5 bronchopulmonary congestion in the subject upon subsequent exposure to the allergen.

1 18. The method of claim 12, wherein the bacterium is orally administered to the
2 subject.

1 19. The method of claim 13, wherein the bacterium is orally administered to the
2 subject.

1 20. The method of claim 14, wherein the bacterium is orally administered to the
2 subject.

1 21. The method of claim 15, wherein the bacterium is orally administered to the
2 subject.

1 22. The method of claim 16, wherein the bacterium is orally administered to the
2 subject.

1 23. The method of claim 17, wherein the bacterium is orally administered to the
2 subject.

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